WELDING PROCEDURE SPECIFICATION

WPS - 3503-1 **REV. NO.:** 0 **DATE:** 10/7/2004 ****APPLICABILITY****

WELDING PROCESS/ES: FCAW **and** FCAW **ASME:** X **AWS:** X

SUPPORTING PQR: P-WS-243 P-WS-243-1 **OTHER:**

JOINT **This WPS shall be used in conjunction with the General Welding Standards (GWS) and Welding Fabrication Procedure (WFP) sections and criteria for joint details, repairs, NDE, inspection etc.**

Weld Joint Type: Groove/fillet **Class:** Full/partial penetration

See GWS 1-06 for joint details **Preparation:** Mechanical/thermal

Root Opening: 3/32"-1/8" **Backing:** Strap/ring

Backgrind root: Root if accessible **Backing Mat.:** CS when used

Bkgrd Method: Grind/arc gouge **GTAW Flux:** N/A **Backing Retainer:** N/A

FILLER METALS: **Class:** E-71-T-x **and** ----------

A No: 1 **SFA Class:** 5.20 **and** ---- **F No:** 6 **and** ---- **Size:** .045 ---- ---- ----

Insert: N/A **Insert Desc.:** N/A **Weld Metal Thickness Range:**

Flux: Type: N/A **Size:** N/A **AWS:** 0.187 **thru** 2.000

Filler Metal Note: Flux core wire with Argon/CO2 gas shielding **ASME:** 0.187 **thru** 2.000

BASE MATERIALS: **P No.** 1 **Gr No.** All **to: P No.** 1 **Gr No.** All

Spec. Steel & steel alloy **Grade:** All **to: Spec.** Steel & steel alloy **Grade:** All

Qualified Pipe Dia Range: = : 2.5

Qualified Thickness Range: **AWS:** 0.187 **thru** 2.000 **ASME:** 0.187 **thru** 2.000

QUALIFIED POSITIONS: Plate-all Pipe-all **Vertical Progression:** V-UP

Preheat Min. Temp.: *70 **°F** **GAS: Shielding:** Argon **or** CO2

Interpass Max. Temp.: 500 **°F** **Gas Composition:** 75 **%** 25 **%** 0 **%**

Preheat Maintinance: *70 **°F** **Gas Flow Rate cfh:** 25 **to** 40

Backing Gas/Comp: N/A 0 **%**

PWHT: Time @ °F Temp. N/A **Backing Gas Flow cfh:** 0 **to** 0

Temp. Range: N/A **°F** **to** N/A **°F** **Trailing Gas/Comp:** N/A **%**

PREPARED BY: KG Fellers **DATE:** 10/7/2004

Signature on file at FWO-DECS

APPROVED BY: Tobin Oruch **DATE:** 10/7/2004

Signature on file at FWO-DECS

Note:For SC/SS/ML-1/ML-2 work, this WPS requires independent review.

WPS NO: 3503-1

WELDING CHARACTERISTICS:

Current: DCEP **and** ---- **Tungsten type:** N/A **Transfer Mode:** Spray

Ranges: Amps 130 **to** 180 **Pulsing Cycle:** N/A **to** N/A

Volts 24 **to** 28 **Background Current:** N/A

Fuel Gas: N/A **Flame:** N/A **Braze temp. °F** N/A **to** N/A

WELDING TECHNIQUE: **For cleaning, grinding, and inspection criteria refer to Volume 2, Welding Fabrication Procedures**

Technique: Semi-auto **Cleaning Method:** Grind/wire brush/file

Single Pass or Multi Pass: M **Stringer or Weave bead (S/W):** S/W **Oscillation:** N/A

GMAW Gun Angle °: 5 **to** 15 **Forehand or Backhand for GMAW (F/B):** FH

GMAW/FCAW Tube to work distance: 3/8"-1/2"

Maximum K/J Heat Input: N/A **Travel speed:** As reqd. **Gas Cup Size:** 1/2"-5/8"

No single pass shall deposit greater than 1/2" thickness of material.

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: N/A **Nil-Ductil Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: (1) Pipe dia. For AWS==24" OD (2)*IPT & pre-heat for =3/4" thick material =200 °F

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	FCAW	E-71-T-x	.045	130 **to** 150	24 **to** 26	4 **to** 6	5 - 15	
2	FCAW	----------	----	140 **to** 180	26 **to** 28	5 **to** 10		
3								
4	FCAW	----------	----	0 **to** 0	0 **to** 0	5 **to** 10		
5			----					
6								
7								
8								

REM. *** Weld layers are representative only - actual number of passes and layer sequence may vary due to variations in joint design, thickness and fitup.**

Use of LANL Welding Procedures and Welder Qualifications for non-LANL work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save LANL and the Government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees posession and use of LANL procedures and qualifications.